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SCIENTIFIC AND TECHNOLOGICAL ASPECTS OF SUSTAINABLE DEVELOPMENT
Progress achieved and problems encountered in the application of science and technology for sustainable development

Report of the Secretary-General

SUMMARY

The present report provides an overview of the progress made in the imlementation of three main Chapters of Agenda 21 dealing with science and technology for sustainable development, including a summary of actions taken so far by CSD.

Chapter 16 on environmentally sound management of biotechnology, focuses upon the need for (a) increasing the availability of food, feed and renewable raw materials; (b) improving human helath; (c) enhancing protection of the environment; (d) enhancing safety and developing international mechanisms for cooperation; and (e) establishing enabling mechanisms for the development and the environmentally sound application of biotechnology.

Chapter 34 dealing with issues related to the transfer of environmentally technology, cooperation and capacity-building, has been focused on three programme areas: improving access to and dissemination of information on environmentally sound technologies; capacity building for managing technological change; and promoting technology cooperation and partnerships.

Chapter 35 covering issues related to science for sustainable development, addresses them in terms of strengthening the scientific basis for sustainable development; enhancing scientific understanding; improving long-term scientific assessments; and building up scientific capacities in all countries.

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III. REFERENCES

I. INTRODUCTION

1. The Commission on Science and Technology for Development (CSTD), at its first session in April 1993, stressed the importance of helping developing countries and countries with economies in transition to harness the potential of science and technology to achieve the objectives set forth by the United Nations Conference on Environment and Development. In this context, the CSTD decided, in resolution IV, to place particular emphasis in its work on policy issues and options related to the development, transfer and utilization of technologies that promote sustainable development objectives, in accordance with the mandate of the Commission and taking into account the provisions of Agenda 21 concerning science and technology.

2. This decision of CSTD is also in line with the recommendation made by ECOSOC at its coordination segment in 1994[1], which urged that the work programmes and schedules of CSTD and the Commission on Sustainable Development (CSD) be better harmonized in order to avoid duplication and enhance complementarities and thus increase their effectiveness. ECOSOC further suggested that CSTD should take into account the ongoing work of CSD in designing its future work programme.

3. Agenda item 7 (a) of the CSTD's second session reflects the above decision and called for a report of the Secretary-General on the results and problems related to the application of science and technology for sustainable development.

4. The main chapters dealing with science and technology in Agenda 21 are: Chapter 16 - Environmentally sound management of biotechnology; Chapter 34 - Transfer of environmentally sound technology, cooperation and capacity-building; and Chapter 35 - Science for sustainable development, although implications for science and technology are spread throughout Agenda 21. Implementation of these three Chapters is the focus of this report, since they are of particular relevance to the work of CSTD.

5. In the course of its first three sessions, the CSD reviewed other chapters dealing with sectoral and cross-sectoral issues. Among them, those of relevance to science and technology are listed in Annex II. The CSTD may also refer to the report of the Panel on Science and Technology for Integrated Land Management (E/CN.16/1995/4) which presents policy issues and options for applying science and technology to integrated land resources management (Chapter 10 of Agenda 21).

6. Much of the documentation for CSD sessions are prepared on an inter-agency basis. The Inter-Agency Committee on Sustainable Development (IACSD) set up in 1993 for inter-agency coordination in relation to Agenda 21, has

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[1] Agreed conclusions on Coordination of the Policies and Activities of the Specialized Agencies and Other Bodies of the United Nations System related to Science and Technology for Development (Agreed conclusions/1994/1) in the Report of the Economic and Social Council at its forty-ninth session (A/49/3).

designated task managers from different agencies. One of the roles of the Task Manager is to prepare, in collaboration with concerned organizations, coordinated inputs for the consolidated analytical report of the Secretary-General which focuses on common United Nations system strategies for the implementation of Agenda 21 and identifies areas for further action for consideration by CSD. Other roles of the Task Manager relate to promoting information exchange and inter-agency contact, and catalyzing joint activities and programmes. The Task Manager system has facilitated collaborative
monitoring and reporting on the progress made in implementing Agenda 21. UNIDO is the Task Manager for Chapter 16; DPCSD is the Task Manager for Chapter 34; and UNESCO is the Task Manager for Chapter 35. Chapter 34 has been reviewed by CSD on a yearly basis, while Chapters 16 and 35 are being reviewed in 1995 only.

7. One problem in monitoring progress in the implementation of Agenda 21, and Chapter 34 in particular, has been the difficulty in obtaining accurate information and statistics on current trends. Reporting to CSD has relied on national reporting by Governments on the specific themes under review. Trends in technology transfer, particularly through foreign direct investment have been difficult to assess because information on the investments of private companies is difficult to secure. It was also difficult to report on activities related to science for sustainable development, as very little information was provided in national reports. A problem in monitoring Chapter 16 seems to be the existence of diverse and sometimes isolated efforts.

II. SCIENCE AND TECHNOLOGY IN AGENDA 21

8. Chapter 16 focuses upon the need for (a) increasing the availability of food, feed and renewable raw materials; (b) improving human health; (c) enhancing protection of the environment; (d) enhancing safety and developing international mechanisms for cooperation; and (e) establishing enabling mechanisms for the development and the environmentally sound application of biotechnology. These five programme areas seek to foster internationally agreed upon principles to be applied to ensure the environmentally sound management of biotechnology, to engender public trust and confidence, to promote the development of sustainable applications of biotechnology and to establish appropriate enabling mechanisms to achieve those objectives.

9. Chapter 34 of Agenda 21 focuses on the transfer of environmentally sound technology (ESTs). ESTs are considered total systems which include know-how, procedures, goods and services, and equipment as well as organizational and managerial procedures. Environmentally sound technologies are also supposed to be compatible with nationally determined socio-economic, cultural and environmental priorities. The activities proposed in this chapter aim at improving conditions and processes on information, access to and transfer of technology (including the state-of-the-art technology and related know-how), as well as on capacity-building, financial arrangements and partnerships.

10. Chapter 35 of Agenda 21 focuses on the role and the use of the sciences in supporting the prudent management of the environment for the daily survival and future socio-economic development of humanity. One of the roles of science cited in the Chapter is to provide information to better enable formulation and selection of environment and development policies in the decision-making process. In order to fulfill this requirement, Chapter 35 proposes activities aimed at strengthening the scientific basis for sustainable development, enhancing scientific understanding, improving long-

term scientific assessments, and building up scientific capacities in all countries.

11. In other chapters, particularly those dealing with sectoral issues, science and technology are considered as means of implementation, along with capacity-building, human resource development and financing.

III. ENVIRONMENTALLY SOUND MANAGEMENT OF BIOTECHNOLOGY (CHAPTER 16)

12. Since UNCED, considerable progress has been achieved in raising awareness among scientists and policy makers, with the result that several developing countries now give high priority to biotechnology development. Developed countries, having increasingly privatized biotechnology research and development, continue to forge rapidly ahead in all sectors, expanding from the pharmaceutical and health sector to the agriculture sector, with a development trend towards the environmental sector.

13. However, many constraints to biotechnology development, diffusion and applications still remain. Such constraints exist in developed countries and, even more so, in developing countries, mostly as a result of slow progress on issues of biosafety regulatory arrangements and intellectual property protection with respect to biotechnology. In addition, financial support for capacity building in developing countries has remained small, depriving developing countries of opportunities to build the critical mass to allow them to benefit from emerging new biotechnologies.

14. As biotechnology continues to make rapid scientific and technological advances, there are increasing gaps in countries' abilities to benefit. Various United Nations agencies and international organizations have taken early initiatives to meet the challenge of the situation and have been actively involved in working with biotechnology and issues related to it.

15. Various United Nations agencies have continued to strengthen their biotechnology and related support programmes and to develop new biotechnology initiatives to assist developing countries. Programmes range from creating awareness to policy formulation to capacity building. Several mechanisms have been introduced, including the establishment of several new scientific institutions and networking arrangements at the national, regional and international levels. Although international biotechnology initiatives and efforts have been fairly distributed to a certain extent among the various regions, countries in Asia and Latin America have advanced in initiating national programmes in biotechnology, either in the form of a new programme or by expanding traditional biotechnology programmes that integrate genetic engineering technology into education and research and development.

16. In general, a limited number of developing countries have made important and, in some cases, rapid progress in enhancing their capacity to generate, adapt, integrate and diffuse biotechnology, both individually and through the various networking arrangements being increasingly promoted.

17. To meet the accelerating demands of a growing worldwide population, the challenge lies not only in increasing food production, but also in significantly improving food distribution systems. Efforts to meet these challenges will be through the successful and environmentally safe application of biotechnology in agriculture with a long-term commitment.

18. Increasing levels of environmental degradation compounded by poor and inadequate development continue to impact negatively on human populations. International efforts have been enhanced in making the uses of biotechnology

in combating major communicable diseases, in promoting health, in improved programmes for treatment and protection from major non-communicable diseases, and in developing appropriate safety procedures. Biotechnology products in health care are now fairly widespread.

19. Of urgent need is the prevention, halting and eventual reversal of the effects of environmental degradation through the safe use of biotechnology. International organizations are promoting production processes that make optimal use of biotechnologies for the rehabilitation of land and water, waste treatment, soil conservation, reforestation and afforestation.

20. A policy issue that requires further attention is that of biosafety. Developing countries and NGOs have expressed concern that private companies might conduct clandestine, indiscriminate field testing of genetically modified organisms in developing countries. Due to a combination of factors, including inadequate financial resources and a lack of understanding of the need for proper biosafety measures, safe laboratory practices are not followed in many R and D facilities where new biotechnology researchers are venturing into emerging areas of genetic engineering technology. For similar reasons, it is difficult for less advanced developing countries to determine and/or prioritize the need for appropriate biotechnology-related tools for research and development as well as for useful practical applications. At the present time, the absence of established biosafety procedures in developing countries constitutes a major constraint to field testing and product development.

21. The experience of UNIDO (Technology and Investment Partnership Initiatives) and others concerned with transfer and development of biotechnology within developing countries indicates that the successes were based on strategic alliances with institutions in developed countries either at the development stage or at both research and development stages. Such strategic alliances might involve public institutions or the private industrial sector, or might involve both. One common factor in most cases was the involvement and participation of an intermediary organization, often with financial and/or technical support. The role of intermediary organizations should be further studied and evaluated as a candidate for future use.

22. In most developing countries, public institutions are the main centres where research is being done in the emerging biotechnologies. Entrepreneurs and industry in many of these countries have still to gain confidence in the potential of investing in commercializing results emanating from the research laboratories.

23. The work of the international biotechnology programmes of United Nations agencies and of organizations such as the OECD Development Centre concerned with the introduction of new technologies into agriculture shows that the extent to which countries can take advantage of new technology will depend on national conditions and policies. External cooperation can facilitate technology development and diffusion, but can only complement - not be a substitute for - national efforts, capacities and policies. It has become clear that biotechnology must not only be understood but also appreciated by policy-makers for it to be closely integrated with other priorities and policies: science and technology, agriculture and agricultural research.

24. Although the new biotechnologies emerged almost two decades ago, the general public is still inadequately informed about the benefits and risks associated with the development and applications of biotechnology. As a result, constraints such as low levels of public acceptance in certain countries and inadequate support by governments and the private sector continue to be encountered. Increasing public concern is anticipated to

arise in areas related to biotechnology impacts on the environment and on social ethics.

IV. TRANSFER OF ENVIRONMENTALLY SOUND TECHNOLOGY, COOPERATION AND CAPACITY BUILDING (CHAPTER 34)

A. Actions taken by CSD and related inter-sessional activities

25. CSD, at its first session, decided to establish an inter-sessional *ad hoc* open-ended working group to assist in the task of assessing and suggesting specific measures to support and promote access to and transfer of technology and in the development of the policy framework to facilitate, promote and finance technology transfer, particularly in relation to the sectoral clusters under consideration.

26. The Inter-sessional *Ad Hoc* Working Group on Technology Transfer and Cooperation, was held in New York in March 1994. The working group focused and made proposals to CSD on three key areas: (a) access to and dissemination of reliable information on environmentally sound technologies; (b) institutional development and capacity-building; and (c) financial partnership arrangements.

27. There were two other inter-sessional meetings of relevance to Chapter 34 prior to the second session of the CSD. One was the Workshop on the Transfer and Development of Environmentally Sound Technologies held in Oslo, Norway in October 1993, jointly organized by UNCTAD and the Government of Norway. The Oslo meeting recognized the need to formulate innovative approaches for technology transfer. The other meeting was a Preparatory meeting on Transfer of Environmentally Sound Technology Cooperation and Capacity Building held in Cartagena, Colombia in November 1993, jointly organized by the Governments of the United States of America and Colombia. The Cartagena meeting examined technology transfer issues in two sectors reviewed by 1994 session of the CSD: liquid waste management and energy efficiency.

28. CSD, at its second session in 1994, adopted the three key areas identified by the *Ad Hoc* Inter-sessional Working Group as priorities for the future work of CSD in relation to Chapter 34 of Agenda 21. At the same session, CSD stressed the following specific areas of activities, in particular: i) promotion of innovative technology transfer modalities and technology partnership arrangements at the enterprise level (including through foreign direct investment); ii) collecting information on venture capital funds for certain types of ESTs; iii) exploring the potential for joint ventures; iv) identification of gaps and/or deficiencies in the information sources or systems and proposals on feasible approaches; v) involvement of small and medium-sized enterprises; vi) sectoral and techno-economic studies and demonstration projects on the transfer of industrial ESTs and techniques; vii) examining the feasibility of establishing a consultative group on environmental technology centres; and viii) promotion of the contribution of national universities and research centres, particularly those of developed countries, in the transfer of available ESTs and expertise.

29. Following the Commission's second session, several intersessional activities were undertaken. The Workshop on the Promotion of Access to and Dissemination of Information on Environmentally Sound Technologies was held in Seoul, Republic of Korea from 30 November to 2 December 1994. The Workshop concentrated on one of the priority issues identified by CSD at its

second session, and adopted the Seoul Plan of Action concerning information exchange about ESTs.

30. Another initiative was the Roundtable on Technology Transfer, Cooperation and Capacity Building, held in Vienna, Austria in February 1995 by UNIDO, in cooperation with UNEP and DPCSD. The purpose of the Roundtable Meeting was to explore the possibility of establishing joint action programmes and strategies for the building of capacities and promotion of ESTs in developing countries, especially with regard to the role of the industrial sector in contributing to the realization of the goals of Agenda 21. The Roundtable defined elements of a work programme on ESTs in three areas:

(a) Policy development

- the use of economic incentives in national policies;
- promotion of technologies for cleaner production and products;
- needs assessments

(b) Institutional development and capacity building: EST centres

(c) Partnership and cooperation

- south-south cooperation
- expanding global partnerships
- technology intermediaries

B. Improving access to and dissemination of information on environmentally sound technologies

31. The experiences gained in the development and operation of information systems and clearinghouses have shown that much work is required to collect and continuously update reliable and adequate information as well as to disseminate it to the end users. In the absence of a substantial amount of additional resources, the tendency is to build on available information systems and networks.

32. Constraints to accessing information on ESTs have included: high direct costs combined with lack of financing; barriers related to the proprietary nature of information systems or technologies; and lack of technical and managerial capacities; and the lack of knowledge on the potential contribution of ESTs to development objectives (resulting in lack of demand). A recognized problem is the weakness of vertical information flows between environmental/cleaner production agencies at one level and industries and non-industrial users at another. The horizontal information flow among different environmental agencies seems to be smoother.

33. The Cleaner Production Programme of UNEP IE has embarked on a strategy emphasizing information exchange to create awareness of the need for cleaner production and, thereby, increase the demand for the transfer of cleaner production technologies. The Cleaner Production Programme has no legally binding international agreement nor any special financial mechanism supporting either national programmes or technology implementation, which made it difficult to promote technology transfer within the framework of the Programme. The Cleaner Production Information Clearinghouse was thus developed under the Programme with the aim to become an effective information dissemination system providing relevant, timely and updated information.

34. The important role of small and medium enterprises (SMEs) in the transfer of ESTs, especially in developing countries, is increasingly

recognized. A study commissioned by UNIDO's Industrial and Technological Information Section (INTIB) concluded that there is a clear indication of a growing demand for environmental information in SMEs in the developing countries, at the same time, a shortage in information supply. The main factors contributing to this information shortfall would include the general tendency that information provided on advanced technologies are mostly targeted to the developed and not to the developing countries. Even in cases where information systems target users in developing countries, these are either large corporations, consultants or researchers at universities or research institutes which may have advanced communication capabilities. The use of advanced technologies and information systems for information transfer does not take into account the limited communication and data handling capabilities in the SME sector in developing countries, and therefore restricts their access.

35. The "Seoul Plan of Action concerning Information Exchange about ESTs" adopted at the Workshop on the Promotion of Access to and Dissemination of Information on ESTs suggested the establishment of a "consultative mechanism" to enhance cooperation and compatibility among existing and planned systems for the exchange of information related to ESTs, particularly those operated by - or with the support of - the United Nations system and under international conventions. A draft outline for the suggested consultative mechanism proposes implementation in two phases. Major actors in the first phase would be United Nations agencies and organizations, secretariats of the relevant international conventions, and other selected international organizations such as the OECD and the IEA. In the second phase, the mechanism may be extended to the participation of other actors, such as managers or private sector information systems related to ESTs as well as business and industry associations.

C. Capacity building for managing technological change

36. The traditional supply-oriented approaches to technical assistance have failed to produce expected results in capacity building. Given such a realization, there has been more emphasis on a participatory approach involving all the stakeholders (including end-users, entrepreneurs, researchers, extension service agents, planners and policy-makers at all levels), on reinforced support to the local private sector, on establishing and strengthening linkages of various kinds, and on inter-disciplinary approaches.

37. Lack of adequately trained manpower, including technology transfer managers, subject matter specialists, extension workers and farmers, has been a major bottleneck in effective transfer of improved technologies. The paucity is getting acute as the process of technology generation and transfer is becoming increasingly complex.

38. In promoting rural-based enterprises as the vehicle for the utilization of post production technologies and as a means of providing livelihood opportunities in the rural communities, manpower training is considered an important requirement to equip project managers and cooperation partners with the skills needed to make informed decisions on the transfer, use and dissemination of technologies that are conducive to sustainable development. It also became evident that training seminars and field demonstrations are important avenues to elucidate and persuade technology end-users of the benefits and risks involved in the application of certain technologies.

39. The CSD, at its second session in 1994, recognized that assessment of needs for capacity building and institutional development related to ESTs could be useful in enhancing development, deployment and transfer of those

technologies. In order to benefit from the experiences gained from those exercises in a broader context, the CSD encouraged developed and developing countries to jointly conduct case studies on needs assessment at the national level. Such case studies are being planned in a number of developing countries.

D. Promoting technology cooperation and partnerships

40. The rapid growth of the demand for ESTs, particularly in developing and the newly industrializing countries and countries with economies in transition, open up new opportunities for EST cooperation and partnerships. Expansion of global operations of major firms, as they set up foreign operations to enter markets, and seek foreign partners to develop new technologies, may also advance the scope for EST cooperation and partnership arrangements.

41. External evaluations of the scientific and technological cooperation programmes with developing countries and countries with economies in transition launched by the European Community, have highlighted a number of lessons for future cooperation in research and technological development:

(i) the importance of mutuality in the project planning and implementation phase;

(ii) the need to base scientific cooperation on the priority needs identified in developing countries and economies in transition. Also, that without local/national support, investments in human capital and scientific infrastructure are not sustainable;

(iii) a clear need to see research priorities in relation to other policy areas such as development cooperation with third countries;

(iv) greater input from local scientists in developing and Central and Eastern European countries was necessary from project formulation through to management; and

(v) the economic and environmental problems of sustainable development required an interdisciplinary approach. Building on local knowledge was vital to make research and its results relevant.

V. SCIENCE FOR SUSTAINABLE DEVELOPMENT (CHAPTER 35)

A. Strengthening the scientific basis for sustainable development

42. Many developing countries lack the necessary scientific manpower and infrastructure to: (i) collect, analyse, interpret and disseminate scientific data and information related to the broad areas of sustainable development as defined in Agenda 21; (ii) develop and apply science-based policies, resource management systems and technologies; (iii) generate new knowledge through science relevant for sustainable management and policy making, in particular through interdisciplinary research. The gap between industrialized and developing countries, in terms of existing capacities in these areas, is also widening.

43. A critical but often neglected link in making effective use of science for sustainable development concerns communication. Science can have an

impact only if it is communicated to various non-specialist user groups in a language and form which can be understood and used. At present there is a serious gap between the producers and users, including policy makers, of scientific information.

44. Since UNCED, two intergovernmental processes have been launched which are specifically dedicated to supporting science for sustainable development in developing countries and to sensitizing governmental decision-makers at the highest possible level in this regard. The first process involves setting up a Commission on Science and Technology for the South (COMSATS) initiated by the Prime Minister of Pakistan. It endorsed the aim of creating twenty centres of excellence in the South as the frontier areas of science related to sustainable development and established the Network of International Centres of Excellence in the South.

45. The second intergovernmental process is the Presidential Forum on the Management of Science and Technology for Development in Africa, initiated by a regional non-governmental scientific organization (Rand Forum). An agreement was reached on holding the periodic sessions of the Presidential Forum as a major endeavor to sensitize the African geo-political geo-economic leadership to the crucial role of science-led development.

B. Enhancing scientific understanding

46. The strategy followed so far in designing and implementing major international research and observation programmes has proved to be sound in principle and feasible in practice. This strategy is based on two principles:

1. The programmes are based upon collaboration between the relevant United Nations bodies and one or more international scientific NGOs. Scientific quality and objectivity as well as policy making relevance is ensured in this way.

2. Scientists from the participating countries participate in designing the international coordinating framework or research agenda, in interaction with a high-level international scientific steering committee. The programme framework developed this way is then integrated into their respective national research and observation activity.

47. Significant progress has been made during the first few years in integrating environmental science in major fields of science like agriculture and health, etc. An example is the integration of a sustainable agriculture component into agricultural research as well as within the work of the international research centres of the Consultative Group on International Agricultural Research (CGIAR), co-sponsored by the World Bank, FAO and UNDP.

48. The integration of natural sciences and socio-economic research has begun at national, regional and international levels. Yet progress appears to be slower than anticipated. A problem shared by both developing and industrialized countries in this regard, is that most current training programmes and institutional structures are sectoral and disciplinary and do not address the complex interactions between people, natural resources, technology, environment and development. In this connexion, it is particularly urgent to provide support for innovative interdisciplinary capacity building activities.

C. Improving long-term scientific assessment

49. The primary objective of this programme area is to provide assessments of the current status and trends in major developmental and environmental issues at the national, sub-regional, regional and global levels.

50. Many subject areas related to environment and development have already significantly be efited from international scientific cooperation. However, there are several emerging interdisciplinary subject areas which are not yet adequately addressed by specific scientific programmes at the international level. One such area identified is environmental economics.

51. Methods presently used to assess different environmental values, such as option and existence values, are not yet universally agreed upon. International scientific cooperation is needed to develop the methodologies which will take into account different cultural and socio-economic situations. The range of issues at the interface of environment and economics, and the scientific inputs necessary to address them, are too broad to be covered by any single institution.

D. Building up scientific capacity and capability

52. Little specific action has been taken at the national level since UNCED in building up scientific capacity for sustainable development

53. As stated in UNESCO's World Science Report for 1994, many industrialized countries spend about 3% of their GNP on R&D activities. In developing countries, the figure in most cases is significantly below 1%. This demonstrates that there is a great shortfall of funds needed for increased scientific capacity building in developing countries and in particular in the least developed countries.

54. Financial support to developing countries in the field of sciences is provided by a number of bilateral donors. However, the limited availability of funds for research assistance and training in specialized scientific fields has become a particular concern. With the overall volume of development assistance funds shrinking and with acute emergencies in developing countries increasing, it seems to become more and more difficult to defend aid budgets for long-term capacity-building for research.

55. Despite considerable efforts, many developing countries, and in particular LDCs, do not yet possess a critical mass of trained personnel in specialized fields and in interdisciplinary approaches related to sustainable development. There needs to be increased efforts to train specialists in many specific areas of science, including those in the sectoral chapters of Agenda 21 (i.e. Chapters 9 to 22). Lack of training facilities at universities or other institutions in many developing countries must also be overcome.

56. A critical but often neglected link in making effective use of science for sustainable development concerns communication. At present there is a serious gap between the "producers" of scientific information and the "users" of such information, including policy makers, teachers, the media, NGOs, and other groups which play a major role in taking action towards sustainable development. The information on which decisions and actions are based is sometimes too sectoral or narrowly-focused to be relevant to the actual needs.

VI. POSSIBLE CONTRIBUTION OF CSTD IN THE FUTURE

57. The contribution of CSTD to CSD's deliberation at its third session in 1995 through CSTD'S Panel on Science and Technology for Integrated Land Management, was much appreciated by CSD, as the Panel provided additional and complementary dimensions to the review of land management, Chapter 10 of Agenda 21.

58. There are other sectoral chapters where science and technology inputs would be very helpful both in analysis of the progress being made/problems encountered and in furthering the efforts to advance implementation and to overcome obstacles. CSTD may wish to consider additional topics where it could provide the complementarity, or focus on those dimensions of chapters 16, 34 and 35 that have not yet been covered.

Annex I

LIST OF MEETINGS RELEVANT TO CHAPTER 34 "TRANSFER OF ESTS, COOPERATION AND CAPACITY-BUILDING"

1. Meeting on "Transfer of ESTs, Cooperation and Capacity-Building", with focus on energy efficiency and liquid waste management, jointly organized by Colombia and the USA, Cartagena, Colombia, 17-19 November 1993.

2. Workshop on "The Transfer and Development of ESTs", jointly organized between Norway and UNCTAD, Oslo, Norway, 13-15 October 1994.

3. Inter-sessional Ad Hoc Open-Ended Working Group on Technology Transfer and Cooperation, New York, February 1994.

4. Third High-Level Advisory Seminar on Cleaner Production, Warsaw, Poland 11-14 October 1994.

5. OECD Workshop on Development Assistance and Technology Cooperation for Cleaner Industrial Production in Developing Countries, Hanover, Germany 28-30 September 1994.

6. Workshop on The Promotion of Access to and Dissemination of Information on ESTs, hosted by the Government of the Republic of Korea, Seoul, 30 November-2 December 1994.

7. Round Table on EST Transfer, Cooperation and Capacity-Building, organized by UNIDO, in cooperation with UNEP and DPCSD, Vienna, Austria, 6-8 February 1995.

Annex II

AGENDA 21 CHAPTERS HAVING STRONG COMPONENTS OF SCIENCE AND TECHNOLOGY

Sectoral themes

Chapter 6	Protecting and promoting human health
Chapter 7	Promoting sustainable human settlement development
Chapter 9	Protection of the atmosphere
Chapter 10	Integrated approach to the planning and management of land resources
Chapter 11	Combatting deforestation
Chapter 12	Managing fragile ecosystems: combatting desertification and drought
Chapter 13	Managing fragile ecosystems: sustainable mountain development
Chapter 14	Promoting sustainable agriculture and rural development
Chapter 15	Conservation of biological diversity
Chapter 16	Environmentally sound management of biotechnology
Chapter 17	Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their living resources
Chapter 18	Protection of the quality and supply of fresh water resources: Application of integrated approaches to the development, management and use of water resources
Chapter 19	Environmentally sound management of toxic chemicals, including prevention of illegal international traffic in toxic and dangerous products
Chapter 20	Environmentally sound management of hazardous wastes, including prevention of illegal international traffic in hazardous wastes
Chapter 21	Environmentally sound management of solid wastes and sewage-related issues
Chapter 22	Safe and environmentally sound management of radioactive wastes

Cross-sectoral themes

Chapter 34	Transfer of environmentally sound technology, cooperation and capacity building
Chapter 35	Science for sustainable development

REFERENCES

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2. Report of the Secretary-General on cross-sectoral issues (E/CN.17/1994/2).

3. Report of the Secretary-General on progress achieved in facilitating and promoting the transfer of environmentally sound technology, cooperation and capacity-building (E/CN.17/1993/10).

4. Report of the Secretary-General on Science for Sustainable Development (E/CN.17/1995/).

5. Report of the Secretary-General on the Transfer of Environmentally Sound Technology, Cooperation and Capacity-Building (E/CN.17/1995/).

6. Report of the Workshop on the Promotion of Access to and Dissemination of Information on Environmentally Sound Technologies (ESTs).